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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/035,034	12/27/2001	Kenneth C. Creta	10559-639001 / P12351	9181

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EXAMINER
INOA, MIDYS

ART UNIT	PAPER NUMBER
2188	

DATE MAILED: 08/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/035,034	CRETA ET AL.	
	Examiner	Art Unit	
	Midys Inoa	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-26 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-26 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 27 December 2001 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on December 27th, 2001 has been considered by the examiner.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "130" has been used to designate both an Interface Bus and a Merge Engine in Figure 1. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:

On Page 4, line 23 and Page 5, line 4, when referring to figure 1, reference number 130 is described as representing two different features of the invention. On Page 4, reference number 130 refers to a Merge Engine while on Page 5 reference number 130 refers to an interface bus.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-6, 8-10, 13-19, and 21-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Glew et al. (5,561,780).

Regarding Claims 1-6, and 10, Glew et al. teaches a buffer 132 ("cache") with a number of cache-line sized storage locations 136 ("cache lines") and an eviction unit 139 enabled to evict data from the storage locations when partial writes fill a single storage location one storage portion 140 ("cache line has multiple portions") at a time. A thirty-two-byte validity filed 144 ("validity bit storage") keeps track of which of the thirty-two portions of each storage location has been written to and when all are full, the storage location ("cache line") is evicted (See Figure 4 and Column 4, lines 59-67 and Column 7, lines 1-30). Glew et al. also discloses that storage in the buffer 132 is very much like storage on an on-chip cache unit (DCU), therefore, as DCU's, buffer 132 may store data corresponding to locations in main memory (See Column 1, lines 25-38 and Column 7, lines 30-32).

Regarding Claims 8, 14, Glew et al. teaches transmitting evicted data through bus unit 130 to an external destination device, which could be a frame buffer or a separate memory (See Column 7, lines 47-52).

Regarding Claims 9, 16, Glew et al. teaches a Write Combining Unit 138 ("input/output device") which provides the data written into the storage locations of buffer 132 (See Figure 4 and Column 7, lines 15-30).

Regarding Claims 13, 15, 18 and 22-26, Glew et al. teaches a buffer 132 ("cache") with a number of cache-line sized storage locations 136 ("cache lines") being written to through the use of a write combining unit 138, and an eviction unit 139 enabled to evict data from the storage locations when partial writes fill a single storage location one storage portion 140 ("cache line

has multiple portions") at a time. A thirty-two-byte validity filed 144 ("validity bit storage") keeps track of which of the thirty-two portions of each storage location has been written to and when all are full, the storage location ("cache line") is evicted (See Figure 4 and Column 4, lines 59-67 and Column 7, lines 1-30). Glew et al. also discloses that storage in the buffer 132 is very much like storage on an on-chip cache unit (DCU), therefore, as DCU's, buffer 132 may store data corresponding to locations in main memory (See Column 1, lines 25-38 and Column 7, lines 30-32).

Regarding Claims 17 and 21, Glew et al. teaches filling cache-line size storage location with a number of combining partial writes and evicting one full storage location using a burst eviction. Therefore, is understood that if more than one write fills a storage location and only one eviction procedure evicts the same storage location, more writes must be executed for each eviction (Column 5, lines 20-33 and Column 7, lines 1-14).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 11 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glew et al. (5,561,780).

Regarding Claim 11, Glew et al. teaches the invention as set forth by claim 10 above. Glew et al. also discloses an eviction mechanism for an on-chip data cache unit in which a cache line is evicted when it is determined that the cache line is full. It would have been obvious to one

of ordinary skill in the art at the time the invention was made to employ the details of the buffer eviction policy disclosed by Glew et al. to accomplish the cache eviction policy since the buffer of Glew et al. behaves much like a usual cache and employing such eviction policy would be very efficient and easy to implement.

Regarding Claim 19, Glew et al. teaches the invention as set forth by claim 18 above. Glew et al. does not teach using an additional write combining unit or I/O device to store additional data onto the buffer 132. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add another inputting unit to the write combining buffer of Glew et al. since such additional inputs would be integrated into the existing eviction system with ease and adding such additional inputs would give the system the capability to process more data.

8. Claims 12 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glew et al. (5,561,780) as applied to claims 11 and 18 respectively, and further in view of "The Cache Memory Book" by Jim Handy. Glew et al. teaches the invention as set forth by claims 11 and 18 above. Glew et al. does not teach buffer 132 being part of a coherency protocol. Handy teaches cache coherency which prevents stale data from being confused with current data (page 124). It would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate the cache coherency of Handy to the buffer of Glew et al. since this buffer behaves much like a cache and adding such protocol would prevent the confusion between good and useless data.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Glew et al. (5,561,780) inview of Van Huben et al. (2002/0083243 A1). Glew et al. teaches the invention as

set forth by claim 1 above. Glew et al. does not teach evicting even if the storage location is not full, as long as there are no other evictions taking place at the same time. Van Huben et al. teaches allowing an initial LRU cast-out operation ("eviction") to complete while all other operations wait. It would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate the wait policy employed in Van Huben et al. to the invention of Glew et al. since such modification would prevent deadlocks or execution conflicts (pages 8-9, paragraph 112).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Midys Inoa whose telephone number is (703) 305-7850. The examiner can normally be reached on M-F 7:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (703) 306-2903. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Midys Inoa
Examiner
Art Unit 2188

MI

Mano Padmanabhan
8/24/03

MANO PADMANABHAN
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